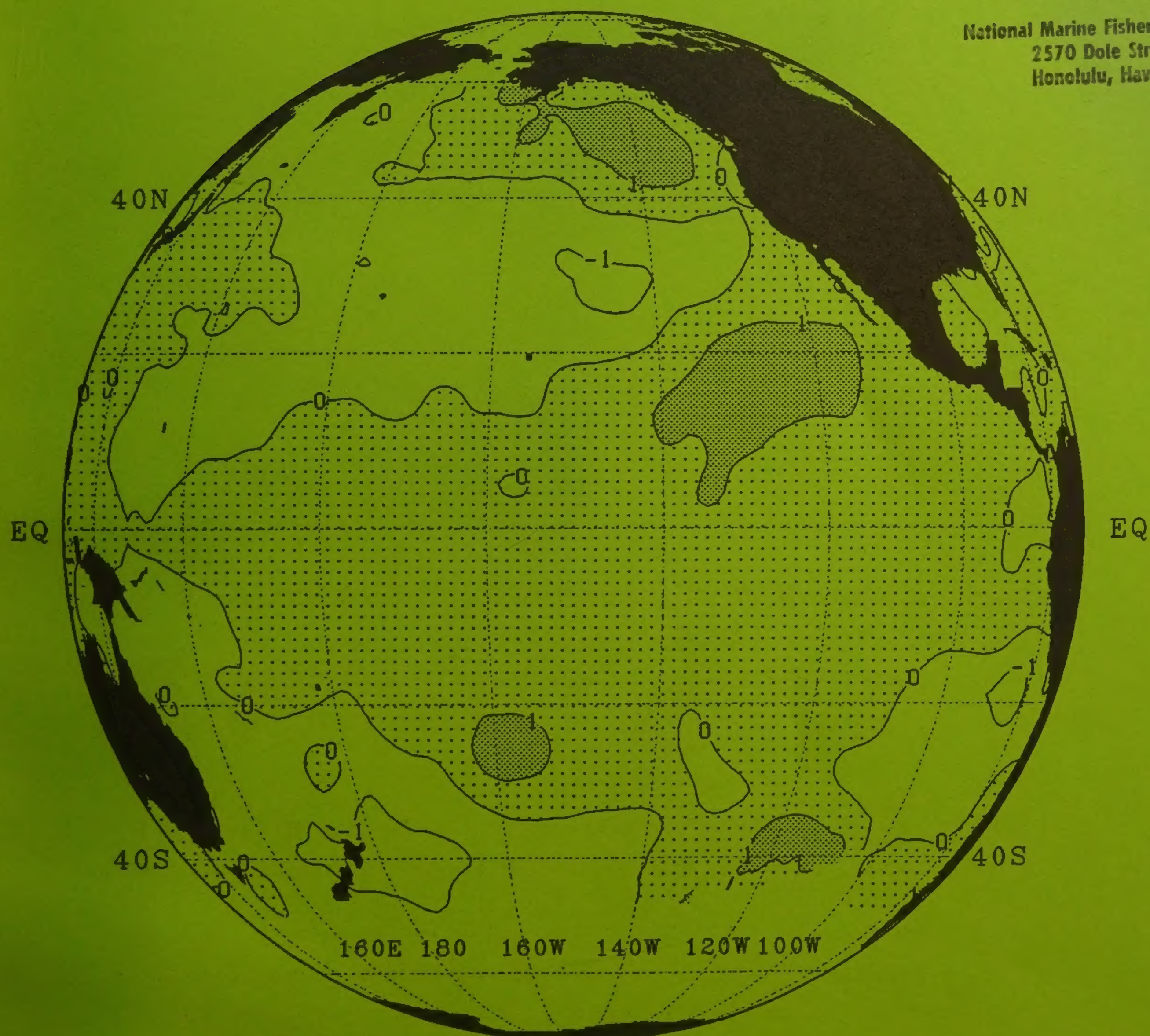
気象庁海洋月報

Monthly Ocean Report

December 1993 (No.12)

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National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成5年12月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで
作成されています。本月報に関する問い合わせは、
〒100　東京都千代田区大手町 1-3-4 気象庁エルニーニョ監視センターまで。
電話 03-3212-8341(内線5134,5135)　　　ファクシミリ 03-3211-3047

Monthly Ocean Report is prepared by the El Niño Monitoring Center(ENMC),
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表紙は1993年12月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for December 1993 in the Pacific Ocean. Areas of positive anomalies are shaded.

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海況の特徴（1993年12月）

太平洋の海況

太平洋赤道域の海面水温は、90°W付近を除いて平年より高かったが、0.5℃以上高い海域は日付変更線付近と140°W付近に限られた。エルニーニョ監視海域（4°S～4°N，150°W～90°W）の海面水温偏差は、+0.4℃だった（第1表、第1図、第6図）。

中部赤道域の20℃等温線の深度は11月まで深まり 150mに達したが、12月の変動は小さかった(第9図)。

北太平洋の海面水温は、30°Nに沿って170°Eから130°Wにかけて平年より低い海域が広がっていた。カリフォルニア半島沖及びアラスカ湾沖では1℃以上平年より高かった（第1図）。

日本近海の海況

日本近海の海面水温は、日本海西部、北海道東方及び三陸沖を除き、平年より高く、特に日本海東部、関東海域及び南西諸島の南東沖では平年より1℃以上高かった(第17図)。

黒潮は、日本の南岸に沿ってほぼ直進し、房総半島沖を東に流れていた（第20図）。

本州東方の親潮系の冷水(深さ100mで5℃以下)は40.6°N・144.8°Eまで達していた(第19図)。

熱帯の気象

今月も熱帯収束帯(ＩＴＣＺ)と、南太平洋収束帯(ＳＰＣＺ)は、はっきり分離した。赤道域の対流活動活発域の中心は160°E付近で、日付変更線付近の対流活動は平年並であった。また、西部熱帯太平洋は全体に対流活動が活発であった。太平洋赤道域の下層東西風は中部と西部で東風偏差、東部ではほぼ平年並となった。下層対流圏の高度場における東西で対照的な偏差分布は見られなくなり、ＳＯＩは＋０.２（暫定値）となった（第1表、第12図、第13図）。

[気象庁長期予報課提供]

本月報の背表紙の太い横線はエルニーニョ監視海域（「太平洋の海況」の項参照）の月平均海面水温偏差を現わしています。本月報を何冊か順番に並べると、背表紙がこの海面水温偏差の推移を現わすグラフになります。

HIGHLIGHTS December 1993

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were higher than normal except around 90°W. However, SSTs more than 0.5°C above normal were found only around the date line and 140°W along the equator. The SST index for region B (refer to Fig.6) was +0.4°C (Table 1 and Figs.1, 6).

The depth of the 20°C isotherm in the central Pacific continued to be 150m, though it deepened till the previous month (Fig.9).

In the North Pacific Ocean, negative SST anomalies have remained from 170°E to 130°W along 30°N. SSTs off Baja California and off the Gulf of Alaska were 1°C above normal (Fig.1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were higher than normal except in the western part of the Japan Sea, off east of Hokkaido and off Sanriku. SSTs were more than 1°C above normal in the eastern part of the Japan Sea, off Kanto and off southeast of the Nansei Islands in particular (Fig.17).

The Kuroshio flowed straight along the south coast of Japan, then it flowed eastward off the Boso Peninsula (Fig.20).

The Oyashio cold water (colder than 5°C at a depth of 100m) extended southward to 40.6°N, 144.8°E (Fig.19).

Atmospheric conditions in the tropics

As both the intertropical convergence zone (ITCZ) and the southern Pacific convergence zone (SPCZ) were evident, convective activities in the vicinity of the date line were near normal. On the other hand, the enhanced convection was observed over the western tropical Pacific. Low level easterlies over the central and western equatorial Pacific were stronger than normal, while those over the eastern equatorial Pacific were almost normal. Consistent with the disappearance of the anomaly pressure pattern, which had persisted for more than a year in the lower troposphere, SOI remained near zero (+0.2 *) (Table 1 and Figs.12, 13). [* Preliminary]

[prepared by the Long-range Forecast Division, JMA]

A Trick !

The thick bar on the spine of this report shows the monthly SST index for region B.

Why don't you put the consecutive issues side by side ?

Errata on Coastal Sea Surface Temperature

Reports No. & Page No.	地　　名 (WMO Index No.)	誤(Error) Temp.	Anom.	正(Correction) Temp.	Anom.
No. 1　P.17	西　郷　(47740)	14.6	—	14.0	—
No. 2　P.17	紋　別　(47435)	-0.8	—	-0.9	—
-Ditto-	輪　島　(47600)	8.2	+0.3	8.1	+0.2
No. 2　P.18	宮　古　(47585)	7.5	+1.5	6.9	+0.9
No. 3　P.17	紋　別　(47435)	0.6	—	0.5	—
No. 4　P.16	紋　別　(47435)	1.6	—	1.7	—
-Ditto-	飛　島　(47587)	—	—	9.2	-0.3
No. 4　P.17	厳　原　(47800)	14.6	—	14.9	—
-Ditto-	館　山　(47672)	12.4	-1.9	12.4	-2.9
No. 5　P.16	飛　島　(47587)	—	—	12.5	+0.2
No. 5　P.17	西　郷　(47740)	16.1	—	17.4	—
-Ditto-	浜　田　(47755)	19.1	—	18.6	—
No. 7　P.16	紋　別　(47435)	14.4	—	14.6	—
-Ditto-	牛　深　(47838)	21.4	—	21.5	—
No. 7　P.18	紋　別　(47435)	16.5	—	16.4	—
No. 8　P.17	飛　島　(47587)	—	—	22.4	-3.4
No.10　P.16	紋　別　(47435)	16.5	—	16.4	—
-Ditto-	輪　島　(47600)	20.6	-0.5	20.5	-0.6
-Ditto-	牛　深　(47838)	24.0	—	23.9	—
No.10　P.17	飛　島　(47587)	18.6	-0.2	17.4	-1.4
No.11　P.16	館　山　(47672)	18.7	-1.5	18.9	-1.3
No.11　P.17	輪　島　(47600)	16.3	+0.5	16.4	+0.6

日本海のブイの経度 (Longitude of the Ocean Data Buoy at The Japan Sea)

Reports No. & Page No.		誤(Error)	正(Correction)
No. 1～No.10	P.16～P.18	145.4E	134.5E

表 A 「気象庁海洋月報」における沿岸海面水温の正誤表

Table A　Errata on Coastal Sea Surface Temperature in Previous Issues

Date	1992 JUL	AUG	SEP	OCT	NOV	DEC	1993 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Pacific Sea Surface Temperature (℃)																		
D (14N~ Eq.) (130E~150E)	29.1 -0.1	29.1 0.0	29.2 0.0	29.5 +0.2	29.0 -0.2	28.7 -0.2	28.0 -0.5	28.0 -0.3	28.2 -0.2	28.6 -0.2	28.8 -0.3	29.2 -0.1	29.1 -0.1	28.9 -0.2	29.1 -0.1	29.1 -0.2	29.5 +0.3	29.1 +0.2
A (4N~ 4S) (160E~150W)	29.2 +0.7	29.1 +0.7	28.8 +0.5	28.8 +0.4	28.7 +0.3	28.8 +0.6	28.5 +0.5	28.4 +0.4	28.4 +0.3	28.7 +0.5	29.0 +0.5	29.1 +0.6	29.1 +0.6	28.8 +0.4	29.1 +0.8	28.8 +0.4	28.9 +0.5	28.7 +0.5
B (4N~ 4S) (150W~ 90W)	25.6 +0.4	24.6 0.0	24.5 -0.1	24.6 0.0	24.7 +0.1	25.0 +0.1	25.5 +0.1	26.6 +0.4	27.4 +0.5	28.1 +1.0	28.0 +1.4	27.0 +0.9	25.8 +0.6	24.9 +0.3	24.8 +0.2	25.0 +0.4	25.2 +0.6	25.3 +0.4
C (Eq.~ 10S) (90W~ 80W)	21.6 0.0	20.5 -0.1	20.2 -0.1	20.8 +0.1	21.2 -0.3	22.5 -0.1	24.3 0.0	26.1 +0.4	27.0 +1.1	26.4 +1.3	25.2 +1.3	23.3 +0.6	22.1 +0.5	21.0 +0.4	20.8 +0.5	21.3 +0.6	21.5 0.0	22.8 +0.2
Pacific Sea Level Anomaly (cm)																		
YAP (10N,138E)	-2	-3	2	9	6	8	7	9	11	1	-2	-2	1	-1	5	8	8	
RABAUL (4S,152E)	-13	-11	-10	-6	-6	-6	-9	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	
MAJURO (7N,171E)	7	7	11	15	6	4	-1	-4	-4	-8	-1	6	5	3	1	5	2	
TARAWA (1N,173E)	2	3	5	2	2	4	1	7	10	3	5	6	4	7	4	6	2	
CHRISTMAS (2N,157W)	-2	-7	-4	-3	4	1	5	4	8	6	5	-1	-2	-1	-1	-2	-1	
SANTA CRUZ (1S, 90W)	-1	-1	-3	-1	-1	-2	4	8	7	7	10	4	0	0	1	3	0	

第1表 (a) エルニーニョ監視指数

Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Dept. of Oceanography, University of Hawaii for the sea level anomaly.

Date	1992 JUL	AUG	SEP	OCT	NOV	DEC	1993 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Southern Oscillation Index (Unit of pressure anomalies at Tahiti and Darwin : hPa)																		
S O I (TAHITI-DARWIN)	-0.5	0.1	-0.0	-2.0	-0.6	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2*
TAHITI (17.5S , 150W)	0.7	0.1	-0.8	-2.3	-0.5	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0*
DARWIN (12.5S , 131E)	1.6	-0.1	-0.8	0.5	0.6	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5*
High Cloud Amount Index																		
HCLD-PH (20N ~ 10N) (110E ~ 140E)	-0.3	0.2	-1.6	0.9	-1.7	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2
HCLD-MC (5N ~ 5S) (110E ~ 135E)	-0.5	-1.2	-0.4	0.6	-0.8	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2
HCLD-DL (5N ~ 5S) (170E ~ 170W)	0.0	0.1	-0.6	-0.1	1.3	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0
Equatorial Zonal Wind Index																		
U200-IN (5N ~ 5S) (80E ~ 100E)	-0.4	-0.4	-1.1	-1.4	0.1	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8
U200-CP (5N ~ 5S) (180 ~ 125W)	0.0	1.1	-0.4	0.7	-0.2	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4
U850-WP (5N ~ 5S) (160E ~ 175W)	0.1	-0.4	0.2	0.2	0.4	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7
U850-CP (5N ~ 5S) (170W ~ 135W)	0.3	-0.7	0.5	-0.4	0.9	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5
U850-EP (5N ~ 5S) (130W ~ 100W)	-0.1	-0.9	0.6	-1.2	1.9	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2

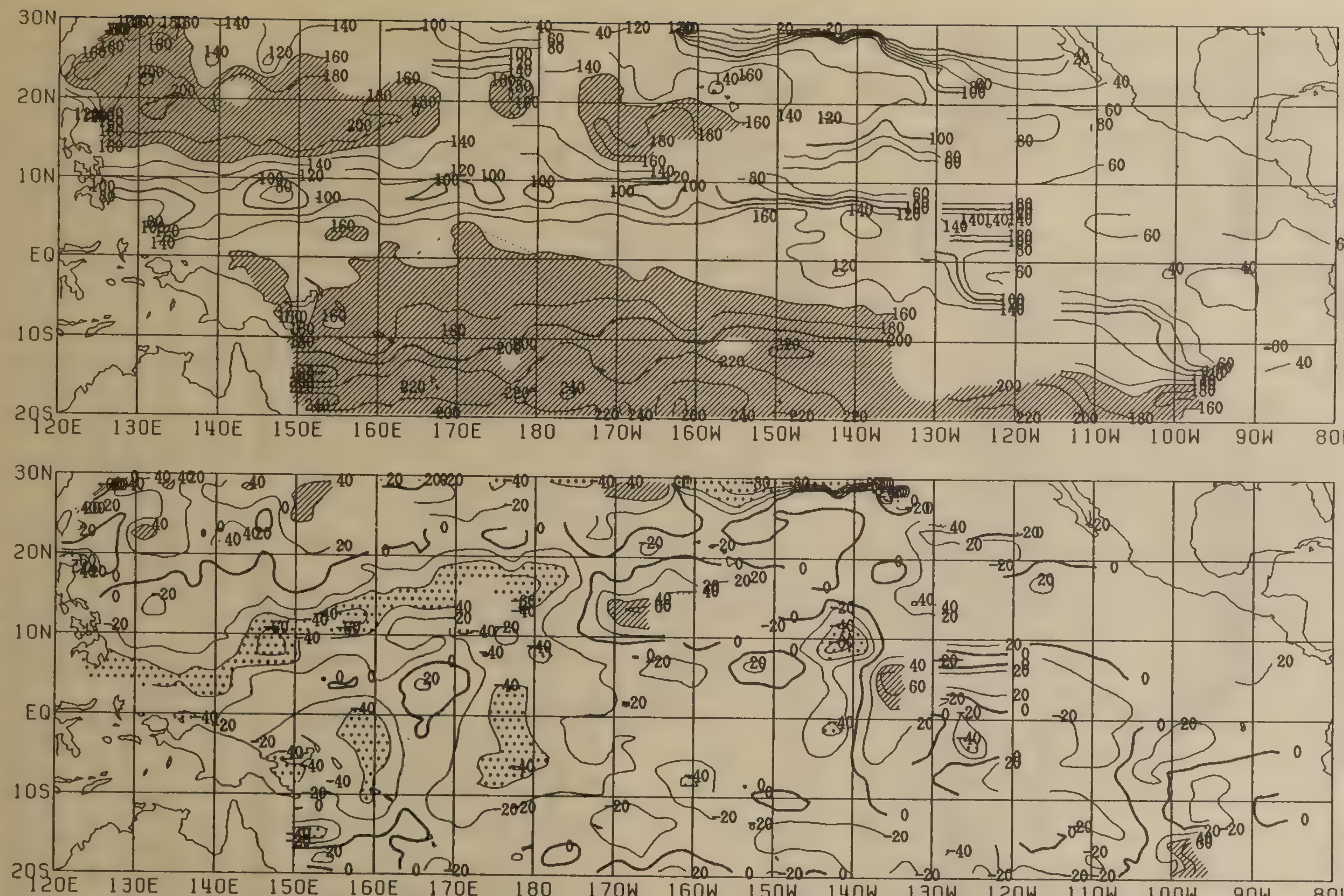
第１表 (b) エルニーニョ監視指数(続き)
Table 1(b) El Niño monitoring indices (continued) .
Data source for these atmospheric conditions is the Long-range Forecast Division, JMA. ＊ 暫定値 (Preliminary)

SST & Anomalies in the Global Ocean



第１図　全球月平均海面水温図（上）及び偏差図（下）（1993年12月）

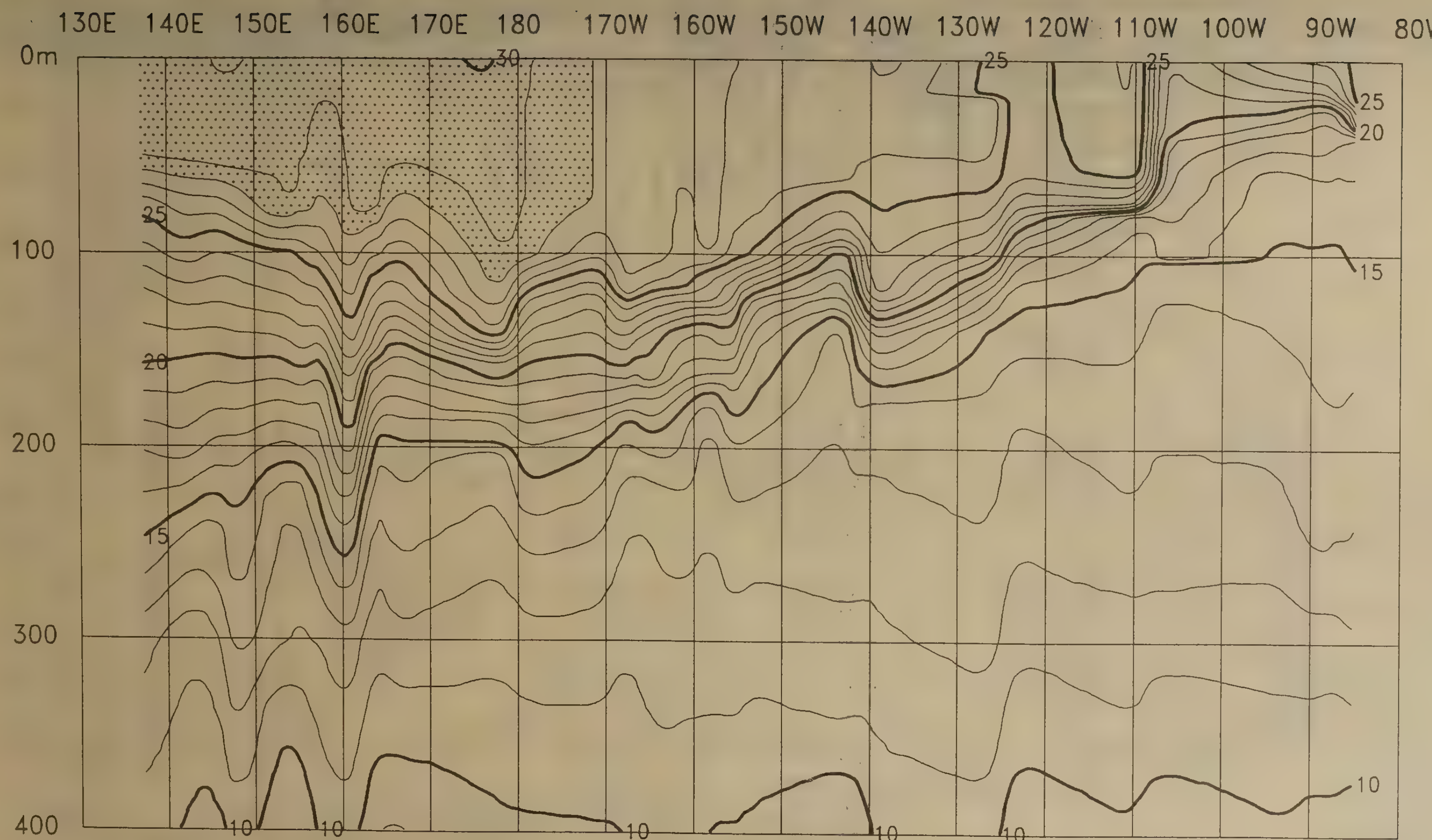
Fig.1 Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for DEC 1993. Anomalies are computed with respect to the JMA climatology (1961−90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991). The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines. Negative anomalies are stippled.



第2図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）（1993年12月）

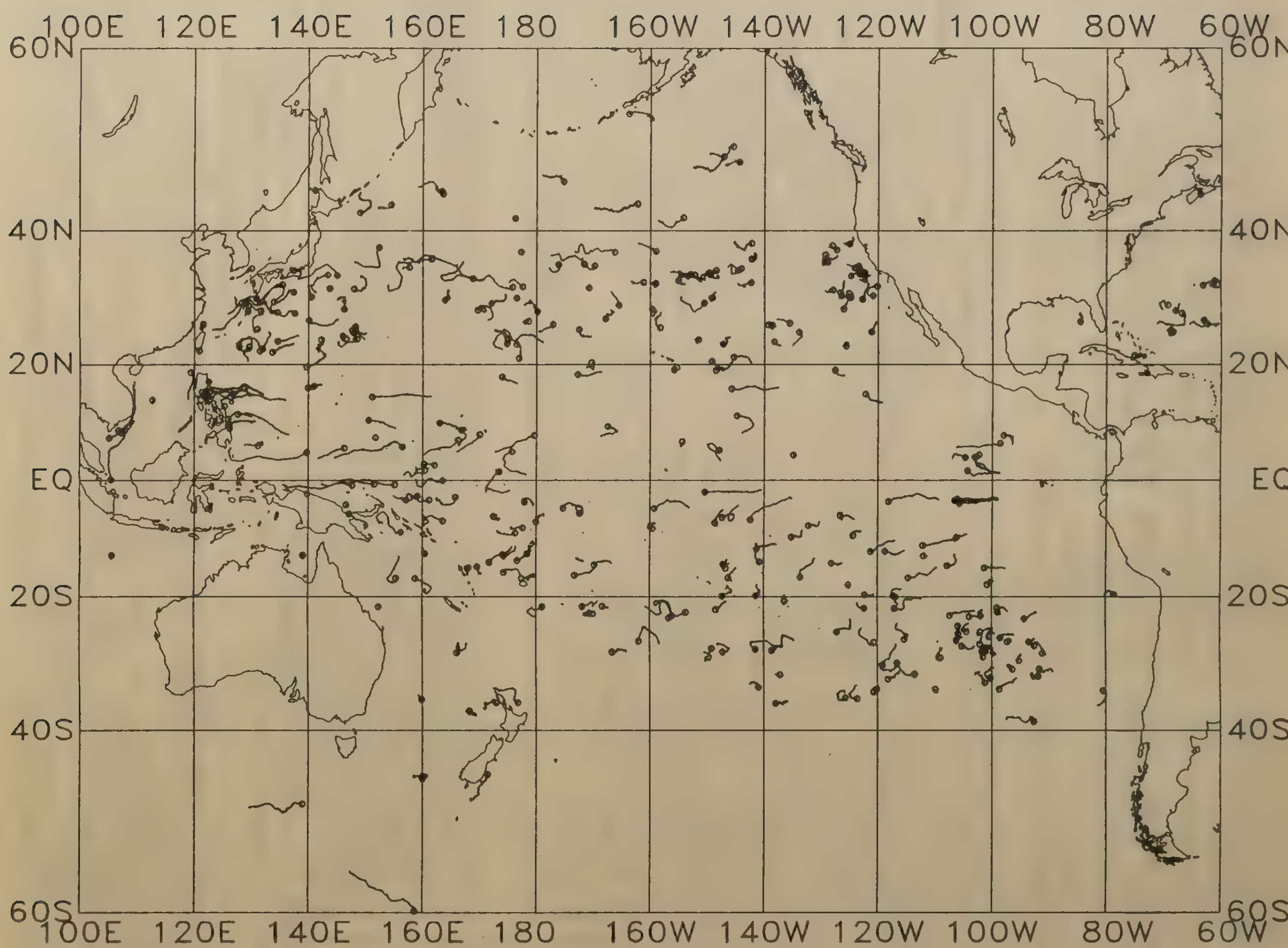
Fig.2　The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for DEC 1993.　Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).

Depth–Longitude Section of Ocean Temperature



第３図　太平洋赤道に沿う表層水温断面図（1993年12月）

Fig.3 Depth–longitude section of the Pacific Ocean temperature along the equator for DEC 1993. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1993年12月)

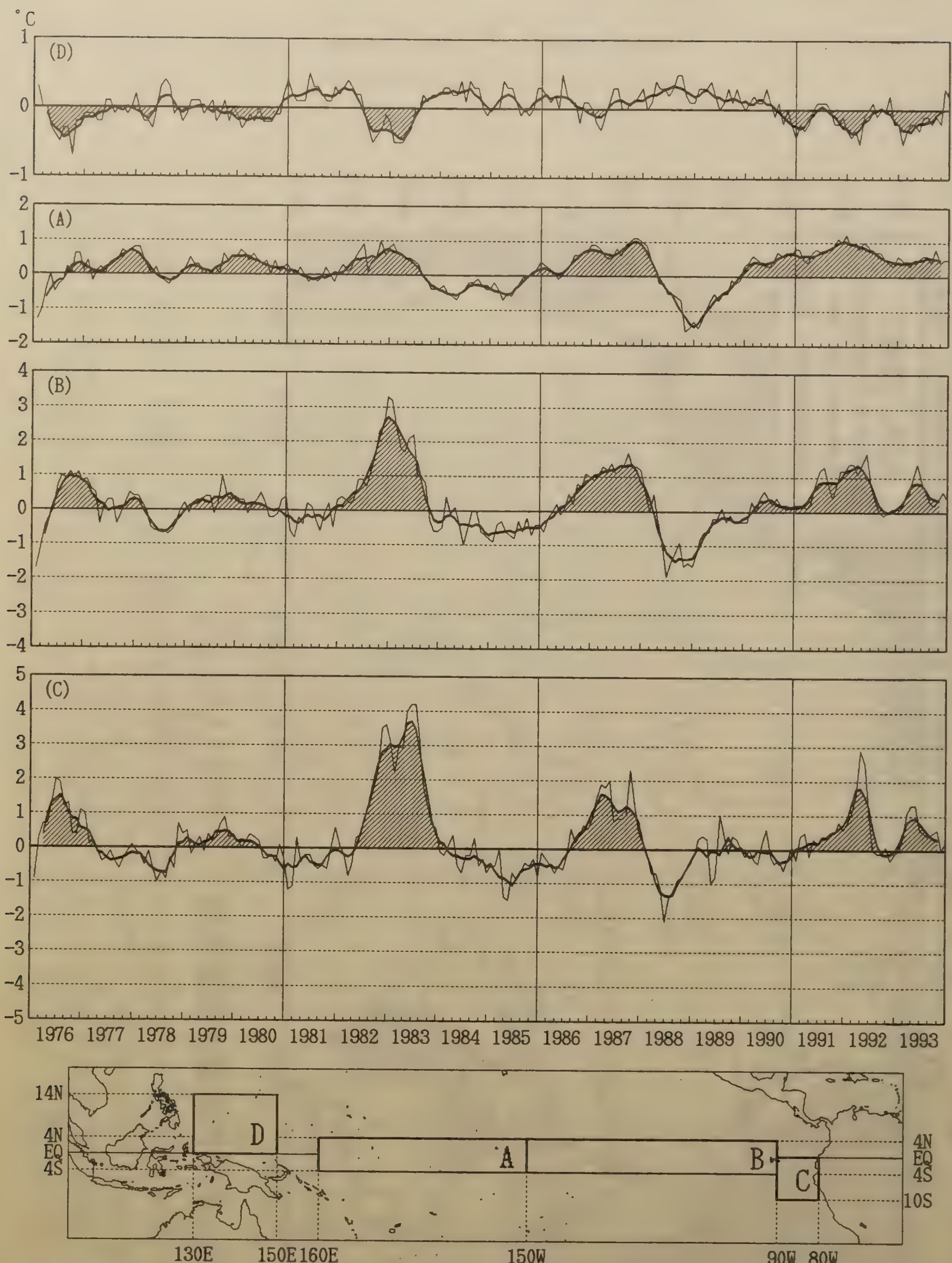
Fig.4 Movements of drifting buoys in the Pacific Ocean during DEC 1993. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（1993年11月）

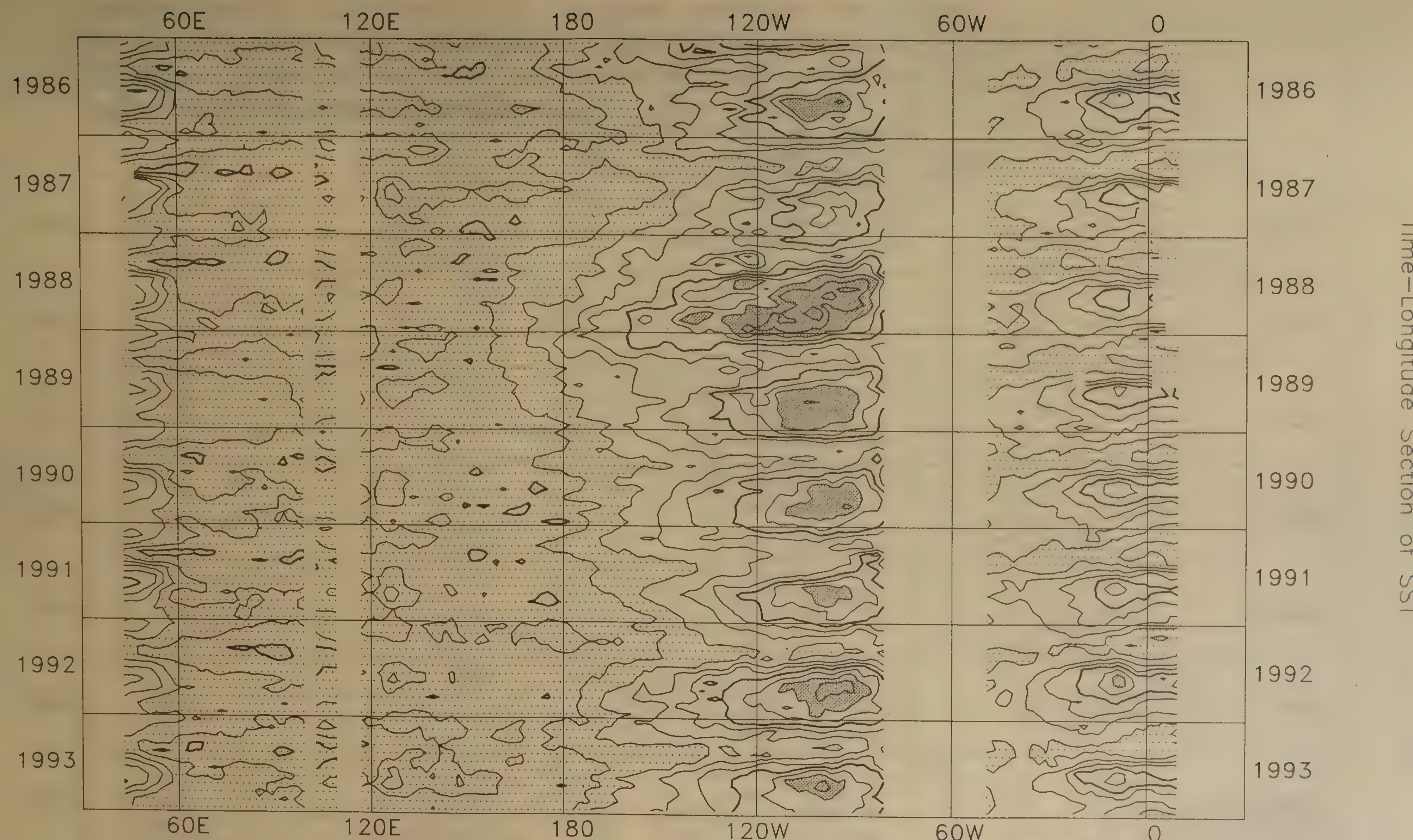
Fig.5 : Sea level anomalies obtained from the 1975 to 1986 mean NOV sea level adjusted for atmospheric pressure (NOV 1993).
This figure is prepared by the SOC of ISLP–PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



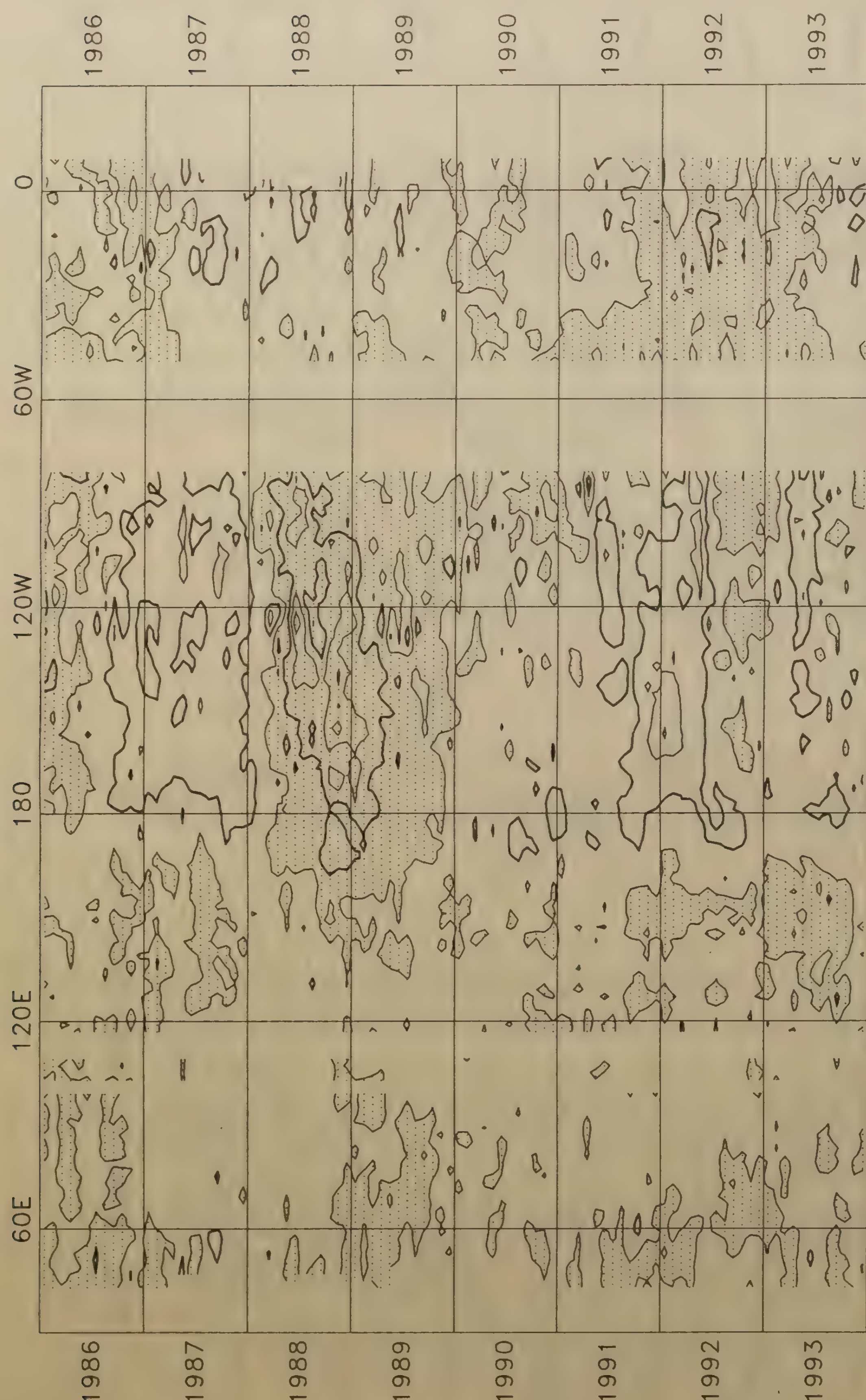
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



第7図　赤道に沿う海面水温時系列図

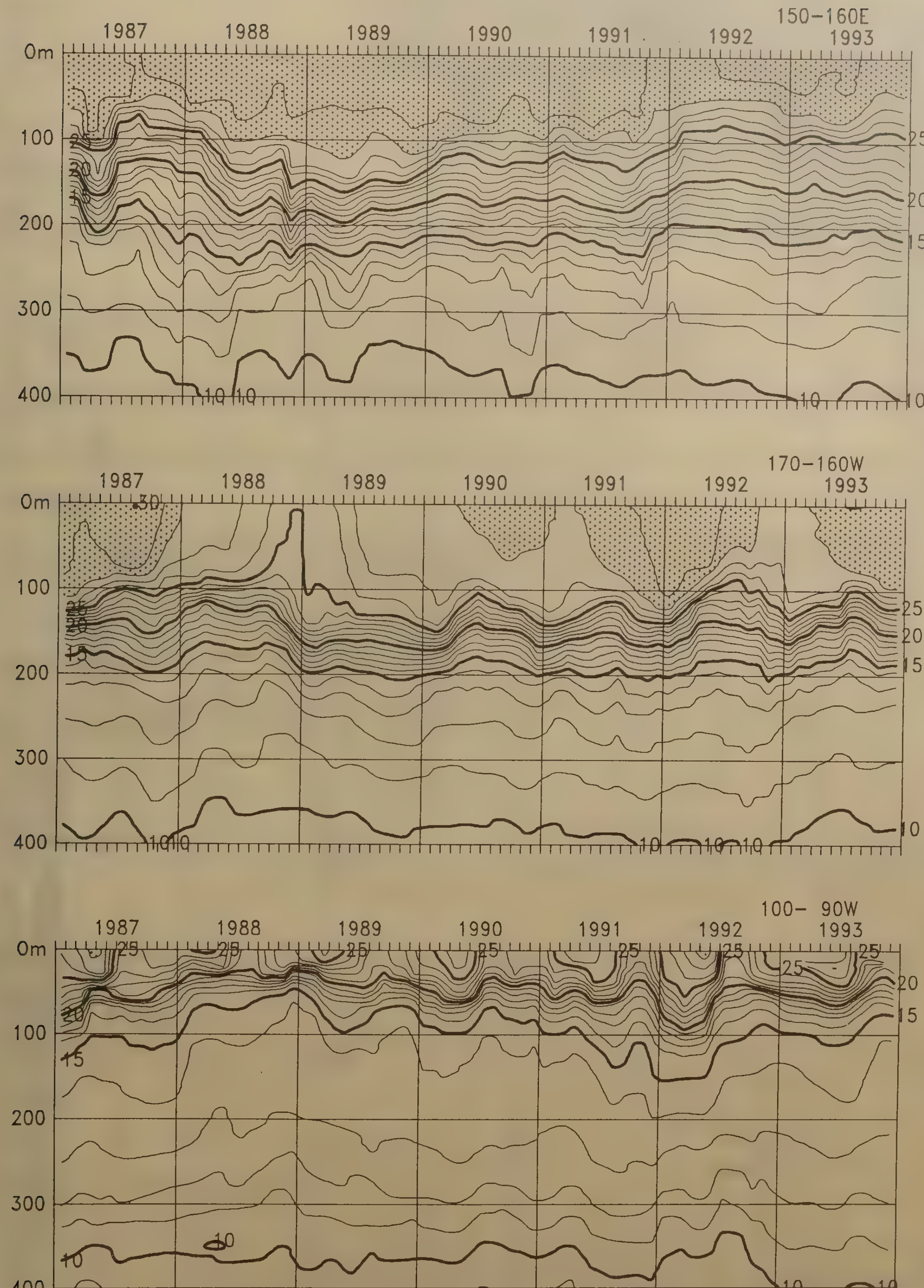
Fig.7 Time−longitude section of SSTs along the equator (2° N−2° S) in the global ocean. : The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time–longitude section of SST anomalies along the equator (2° N–2° S) based on the JMA climatology (1961–1990). The contour interval is 1° C, with thick contour lines at +1° C and −1° C. Negative anomalies are spotted.

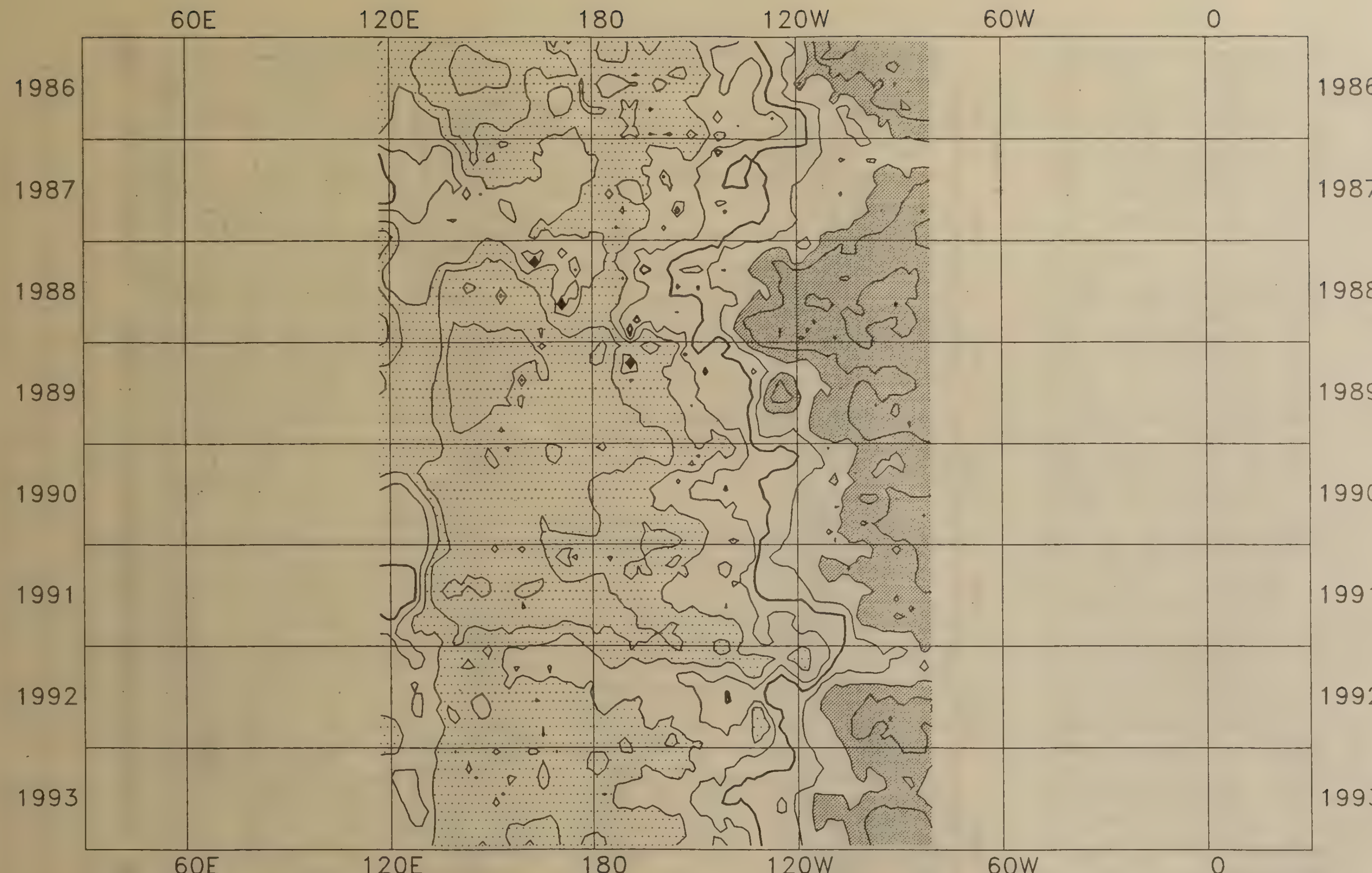
Time Series of Equatorial Subsurface Temperature



第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

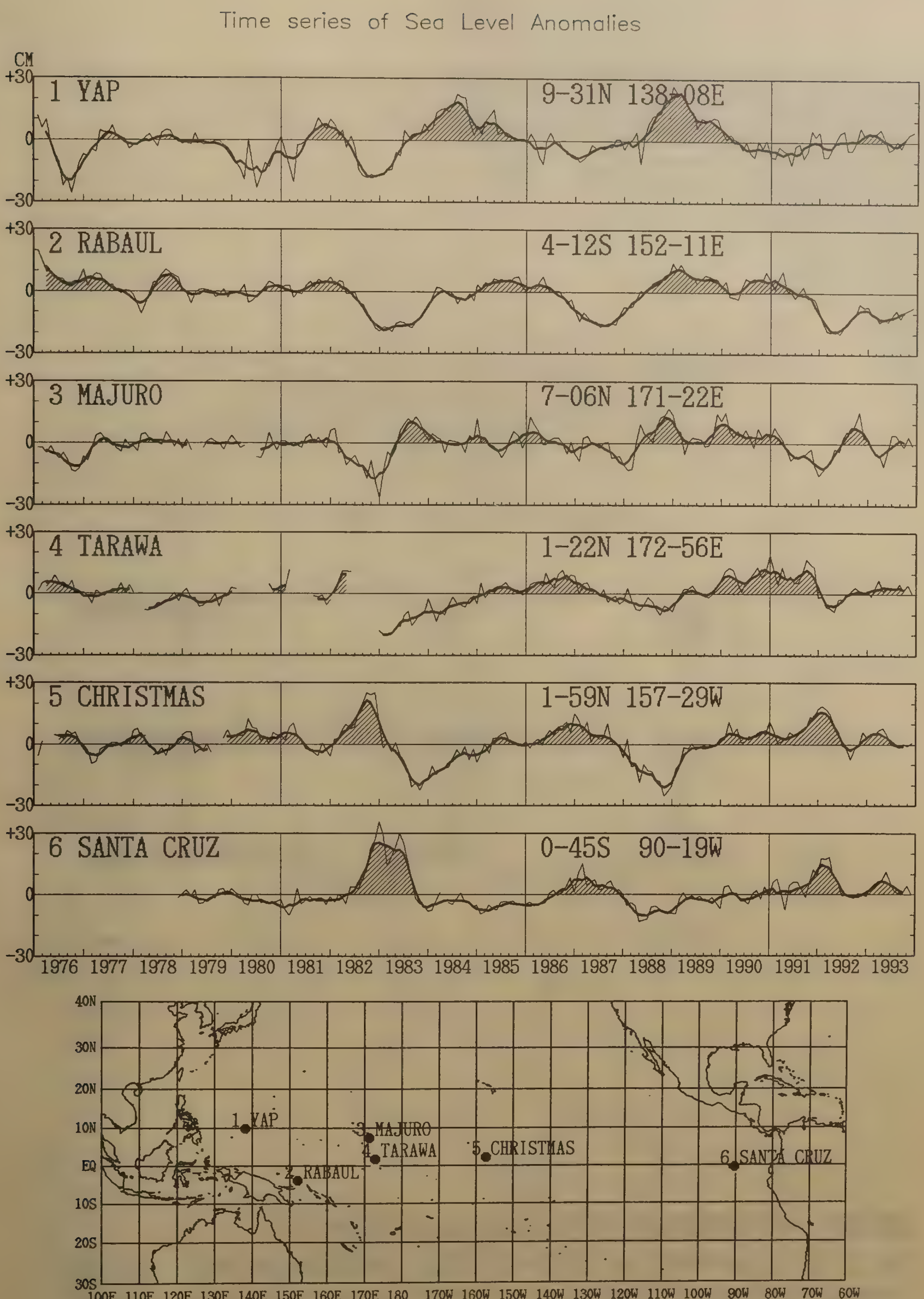
Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.

Time−Longitude Section of the Depth of 20° C



第10図　太平洋の赤道に沿う20℃深度時系列図

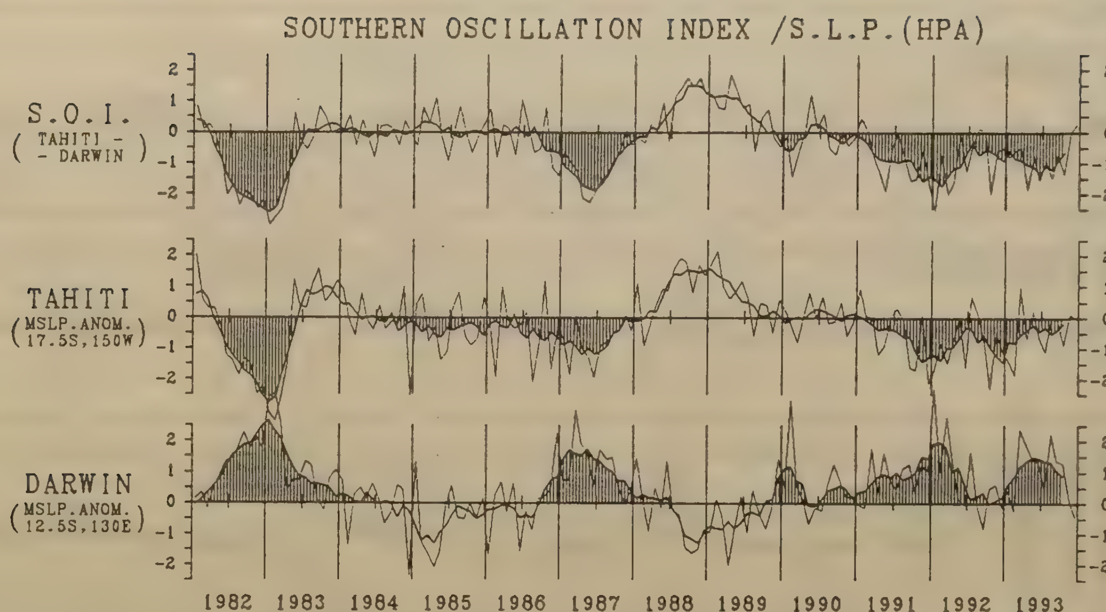
Fig.10 Time−longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

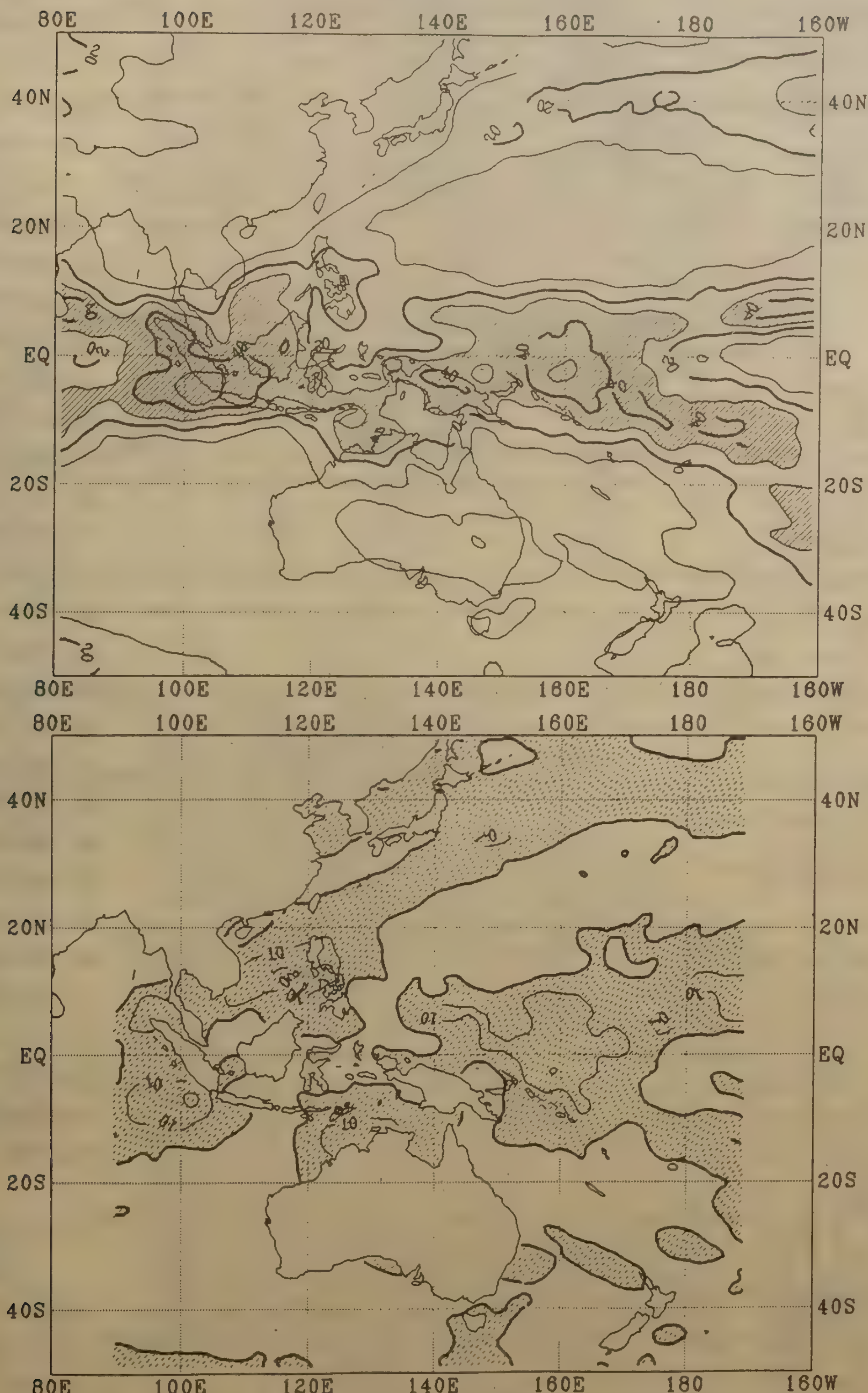
Time series of SOI & Sea Level Pressure Standardized Anomalies



第12図　南方振動指数及び海面気圧偏差時系列図

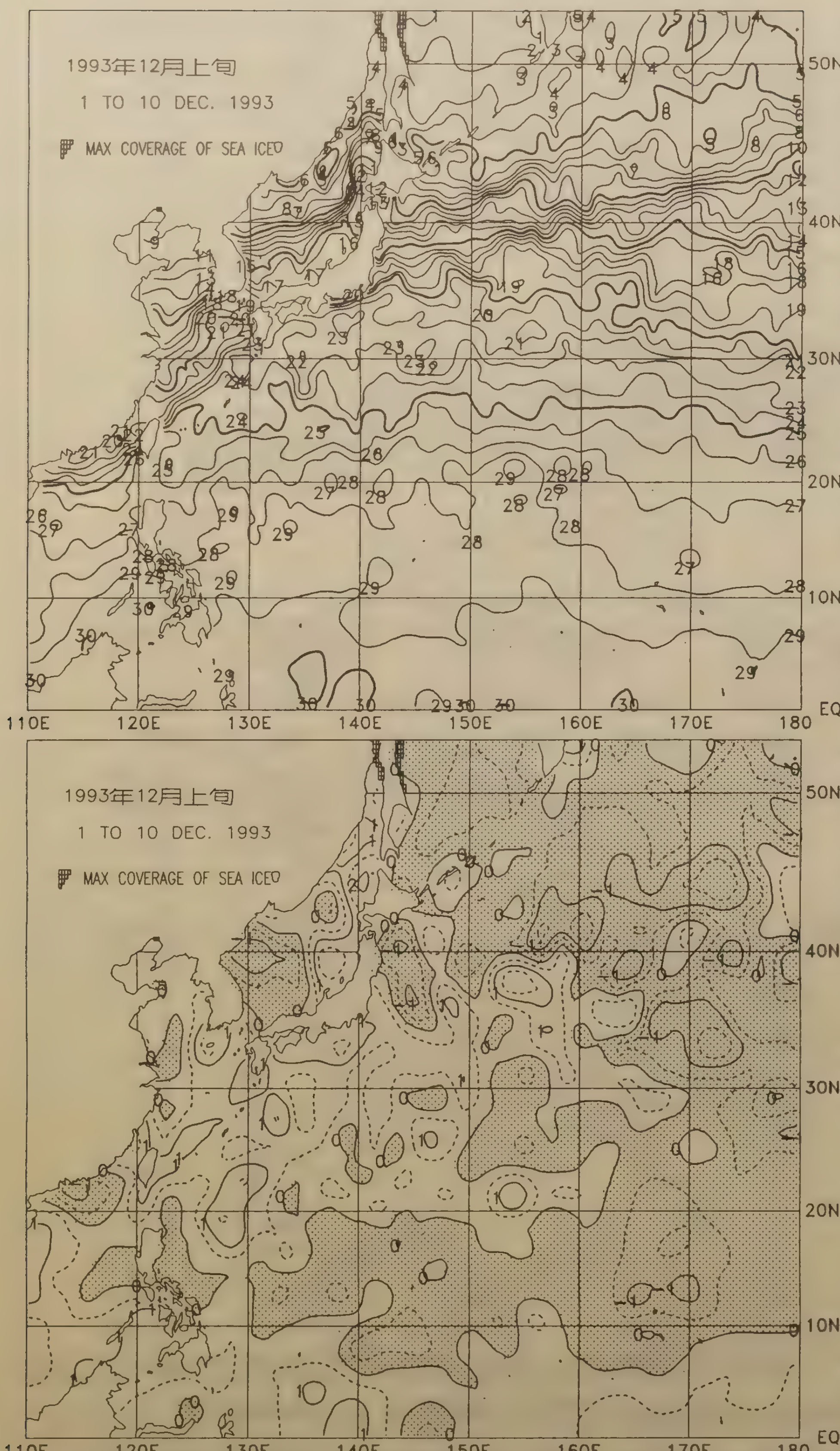
Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.

High−Cloud Amount & Anomalies



第13図　月平均上層雲量分布図及び偏差図（1993年12月）

Fig.13 Monthly mean of the high−cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for DEC 1993. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978−1990 base period monthly means. This figure is prepared by the Long−range Forecast Division, JMA.



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	24.5	+2.1
那　覇(47936)	24.4	+1.9
名　瀬(47909)	-	-
足摺岬(47898)	19.4	+0.5
潮　岬(47778)	20.9	-
御前崎(47655)	15.8	+1.5
八丈島(47678)	21.3	+1.3
館　山(47672)	18.1	+1.0
小名浜(47598)	15.8	+2.0
宮　古(47585)	13.1	+0.3
浦　河(47426)	6.7	0.0
紋　別(47435)	3.9	-
稚　内(47401)	4.8	-
寿　都(47421)	10.2	-
江　差(47428)	9.4	-
飛　島(47587)	14.2	+0.3
輪　島(47600)	13.2	-0.2
西　郷(47740)	16.7	-
浜　田(47755)	15.5	-
厳　原(47800)	17.7	-
牛　深(47838)	18.5	-

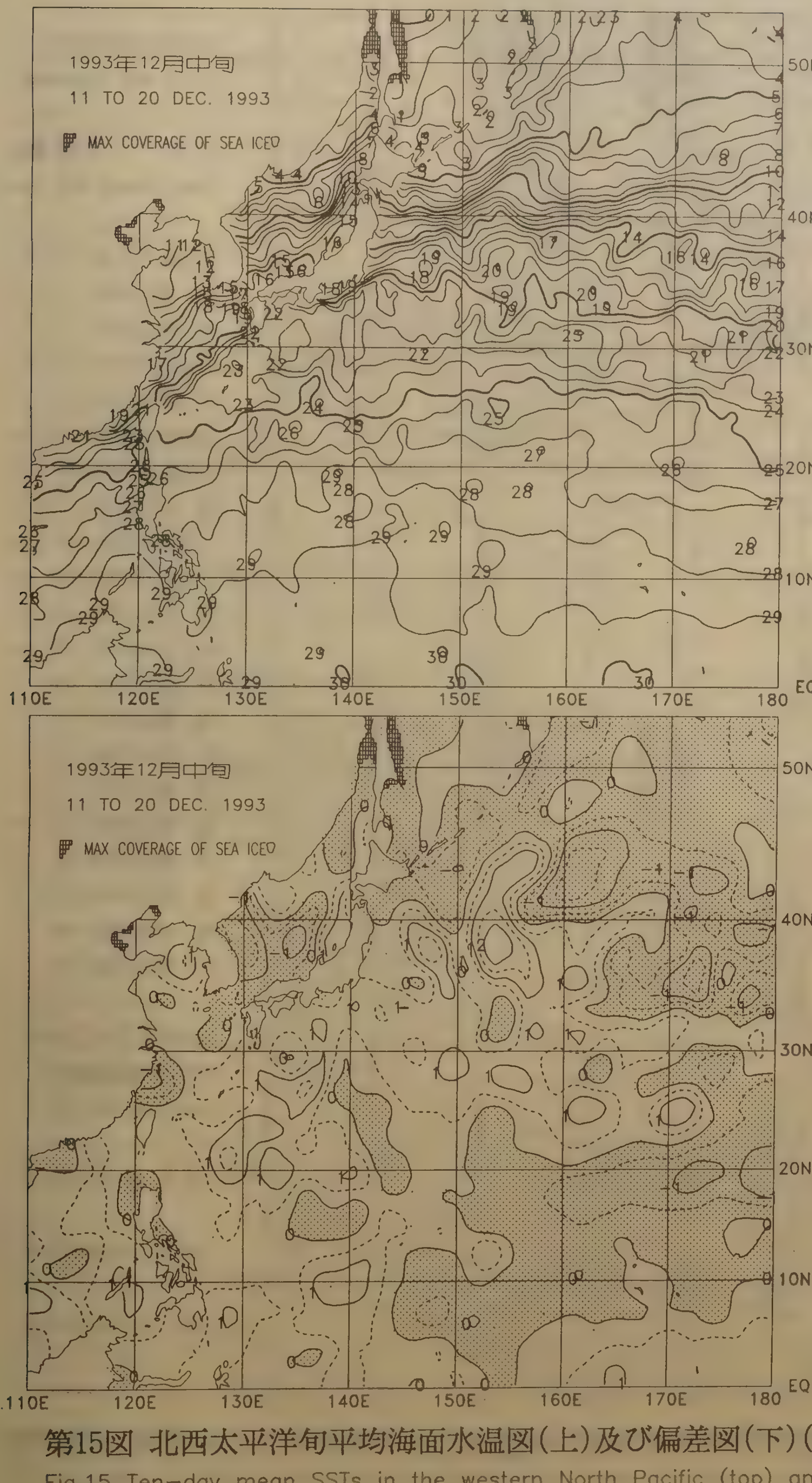
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	13.5
四国沖	29.0N,135.0E	22.8
東シナ海	28.2N,126.3E	22.6

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年12月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in DEC 1993. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

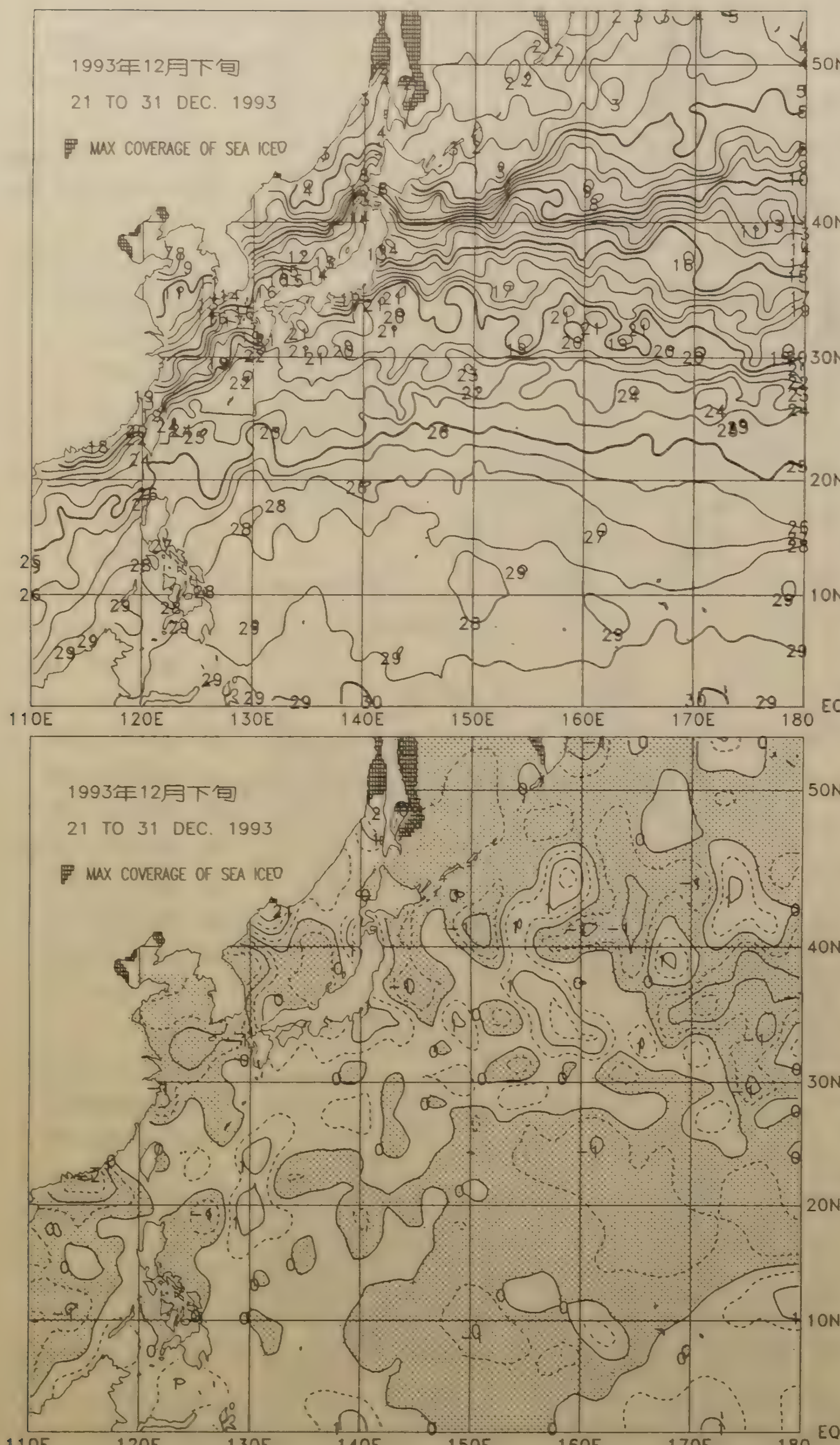
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	23.4	+1.6
那　覇(47936)	22.8	+0.7
名　瀬(47909)	-	-
足摺岬(47898)	17.9	−0.2
潮　岬(47778)	19.3	-
御前崎(47655)	15.2	+1.7
八丈島(47678)	20.4	+1.0
館　山(47672)	17.4	+1.2
小名浜(47598)	14.5	+1.4
宮　古(47585)	11.7	0.0
浦　河(47426)	4.7	−1.1
紋　別(47435)	3.1	-
稚　内(47401)	2.7	-
寿　都(47421)	9.4	-
江　差(47428)	8.0	-
飛　島(47587)	13.0	+0.1
輪　島(47600)	13.0	+0.8
西　郷(47740)	15.6	-
浜　田(47755)	14.5	-
厳　原(47800)	16.9	-
牛　深(47838)	17.7	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

地点	位置	水温
日本海	37.9N,134.5E	12.4
四国沖	29.0N,135.0E	22.1
東シナ海	28.2N,126.3E	22.5

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年12月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in DEC 1993. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	22.4	+0.9
那覇(47936)	-	-
名瀬(47909)	-	-
足摺岬(47898)	17.7	+0.2
潮岬(47778)	17.5	-
御前崎(47655)	13.4	+1.0
八丈島(47678)	19.7	+1.1
館山(47672)	-	-
小名浜(47598)	13.1	+1.0
宮古(47585)	10.7	0.0
浦河(47426)	3.6	-0.7
紋別(47435)	1.6	-
稚内(47401)	2.6	-
寿都(47421)	-	-
江差(47428)	7.5	-
飛島(47587)	-	-
[illegible]島(47600)	11.9	+0.7
西郷(47740)	14.7	-
浜田(47755)	13.1	-
厳原(47800)	16.0	-
牛深(47838)	16.6	-

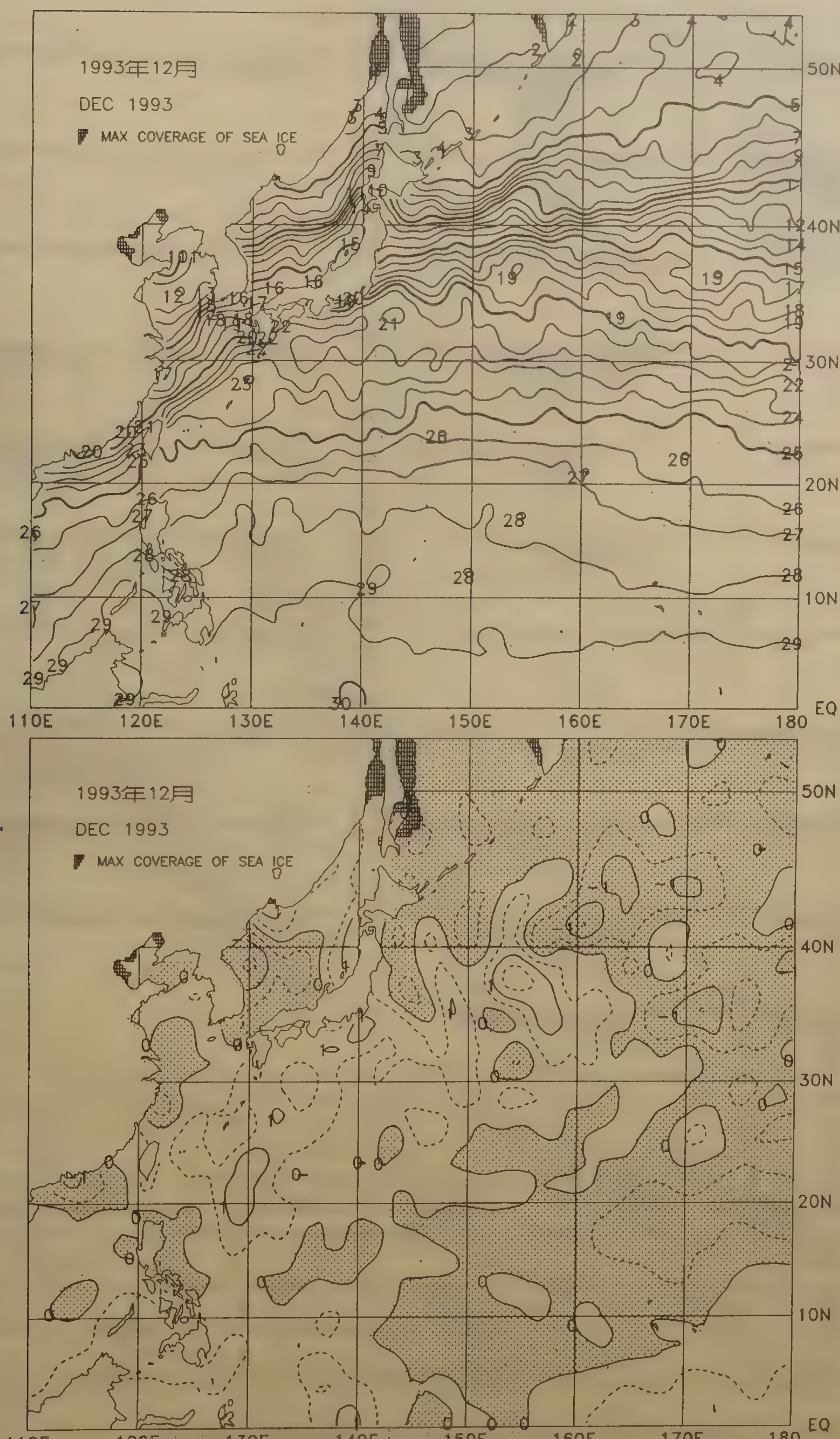
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

	位置	水温
日本海	37.9N,134.5E	11.7
四国沖	29.0N,135.0E	21.4
東シナ海	28.2N,126.3E	20.4

第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1993年12月下旬)

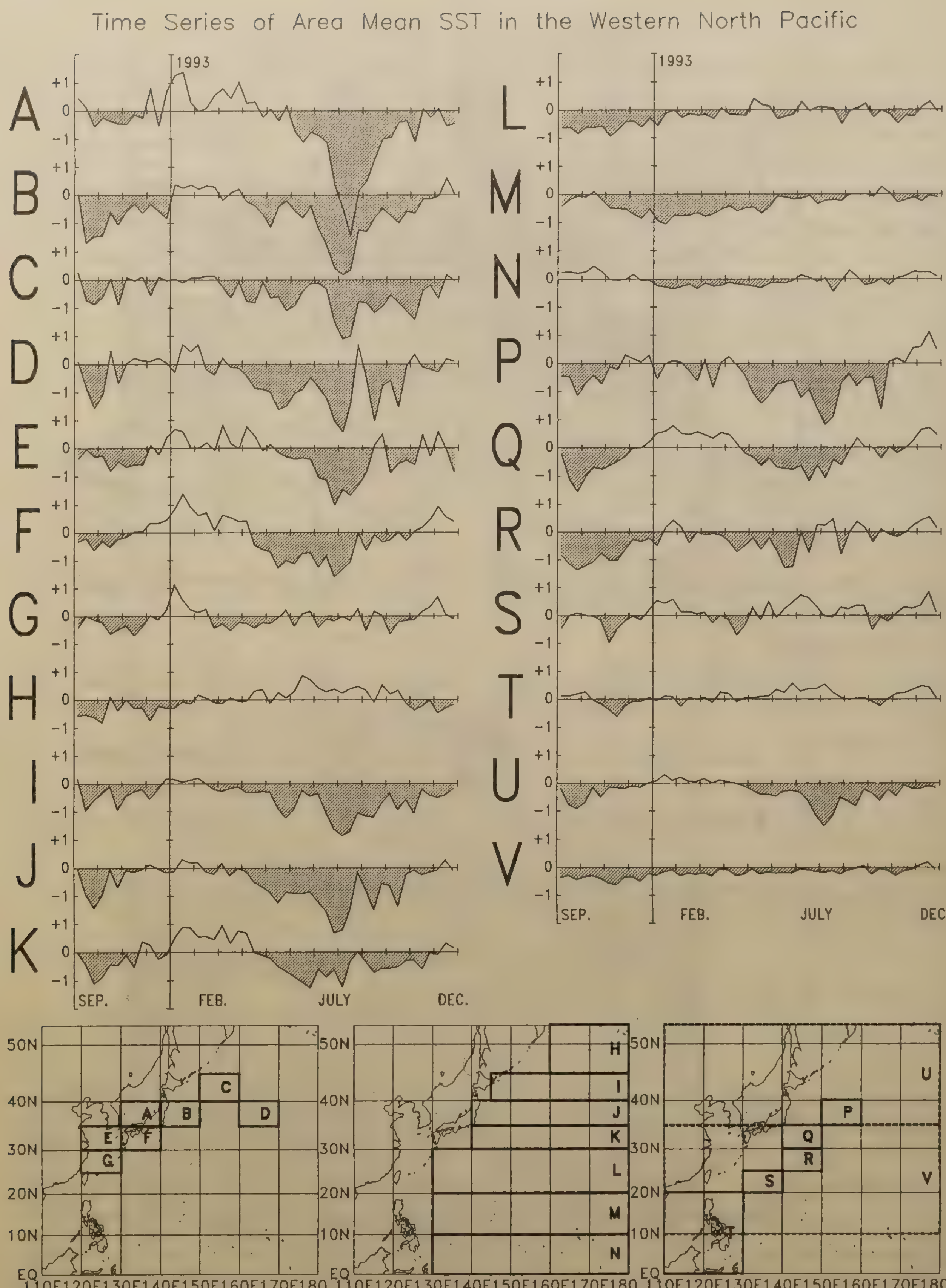
Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in DEC 1993. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.

Monthly Mean SST & Anomalies



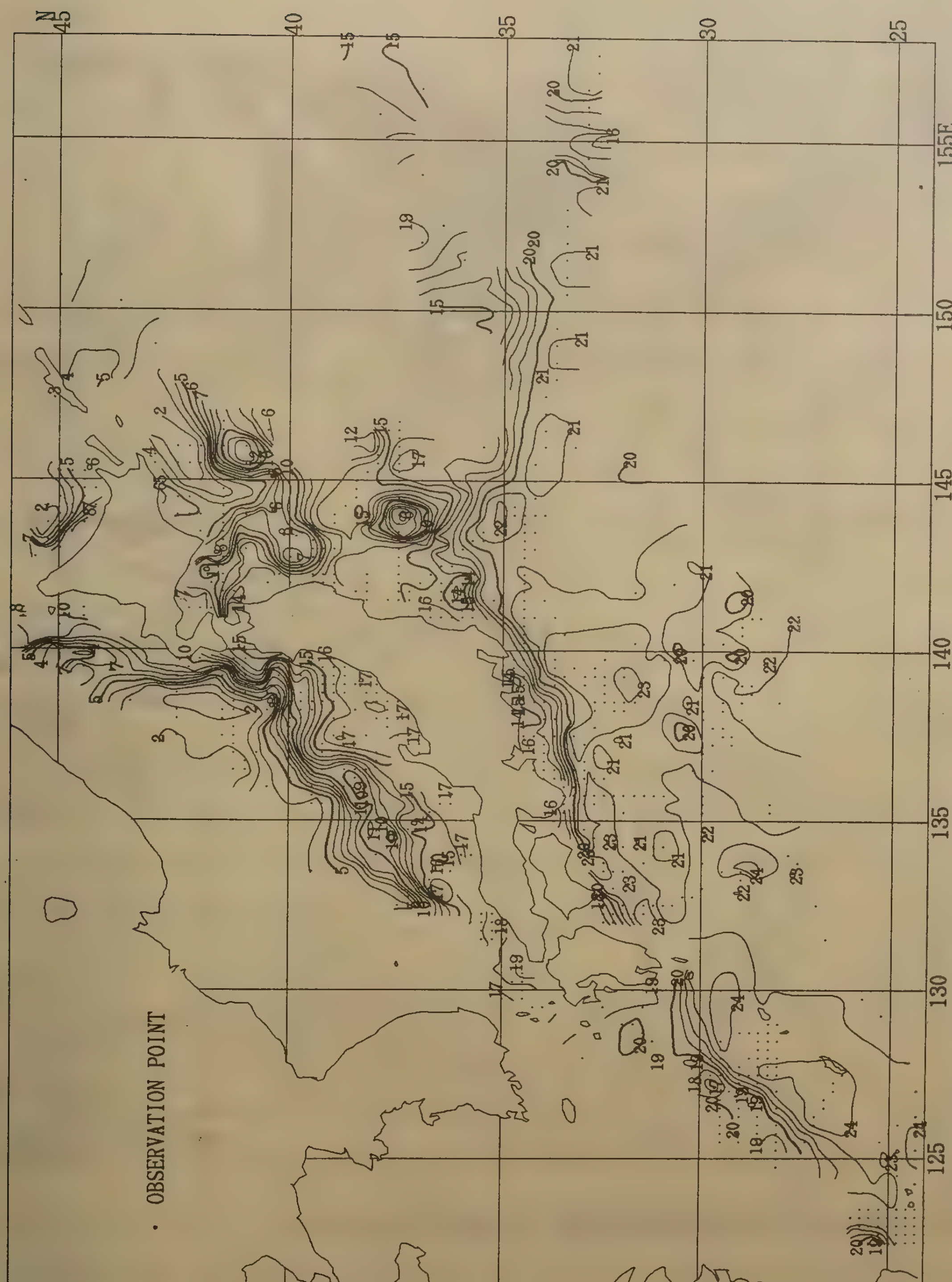
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1993年12月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for DEC 1993. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



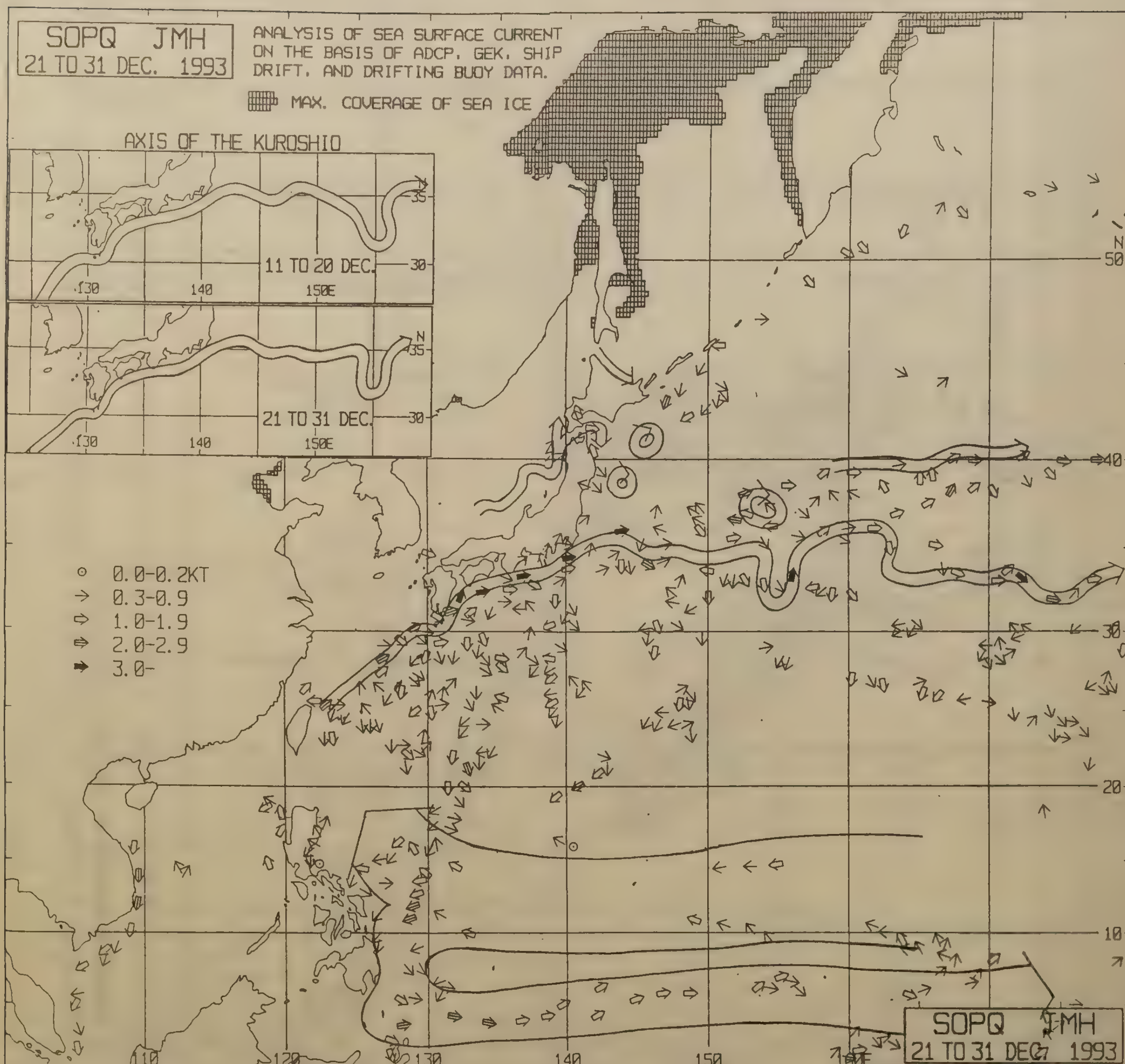
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten–day mean sea surface temperature anomalies (° C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961–90).



第19図　日本近海表層水温（深さ100M）図（1993年12月）

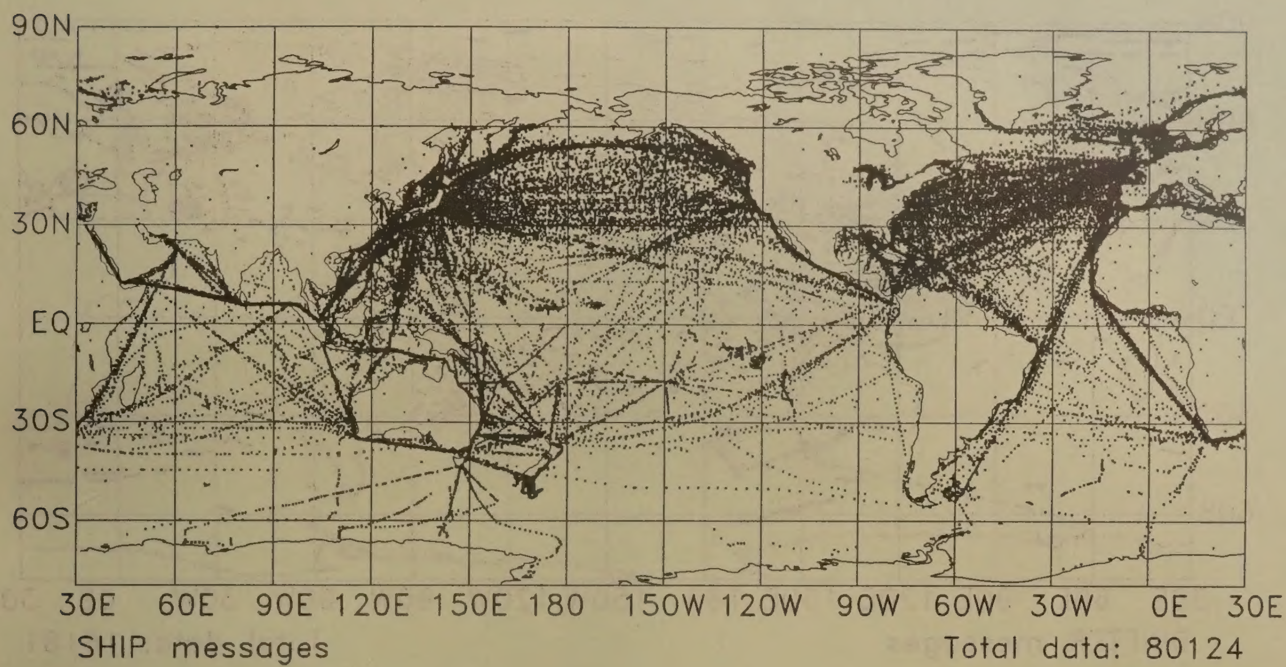
Fig.19　Subsurface (100m) temperatures in seas adjacent to Japan for DEC 1993.

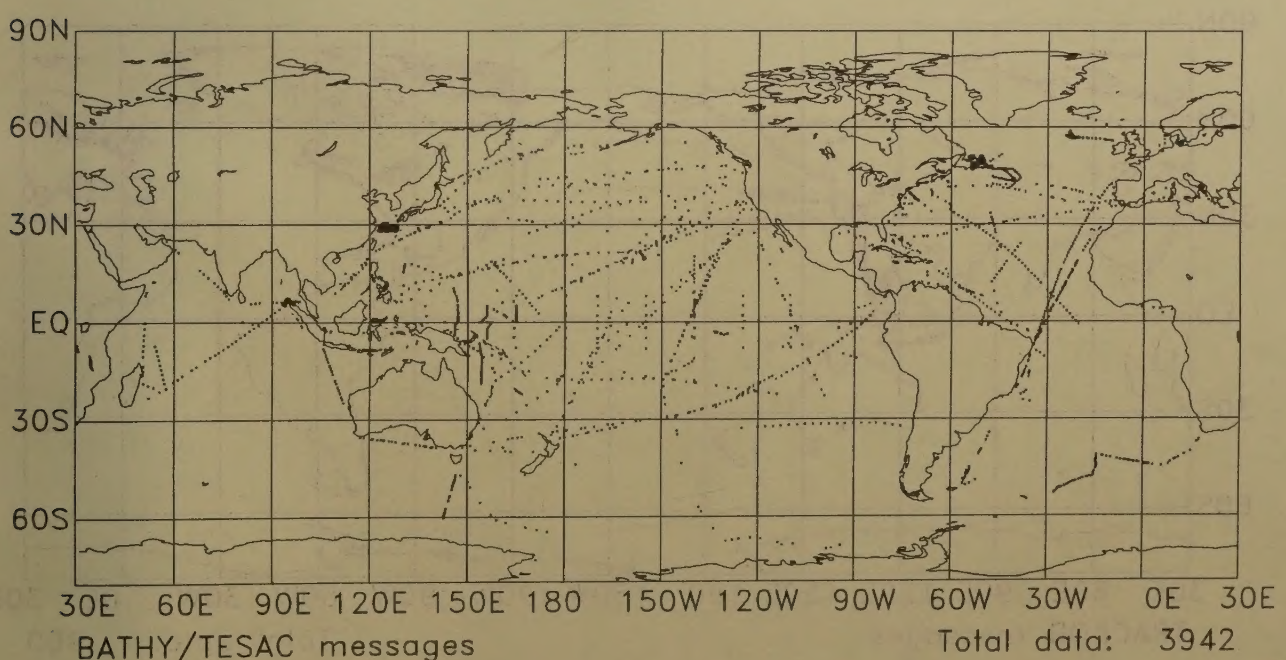


第20図　北西太平洋旬平均海流図（1993年12月下旬）

Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in DEC 1993. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

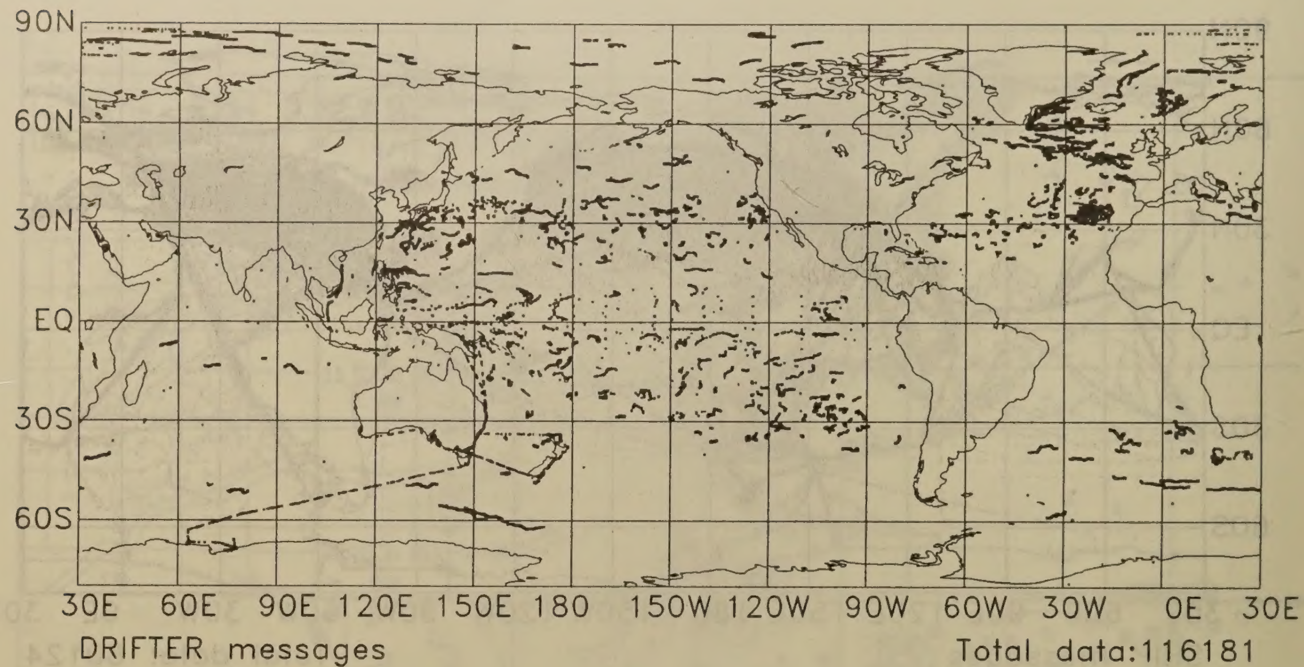
Geographical Distribution of Oceanographic Data

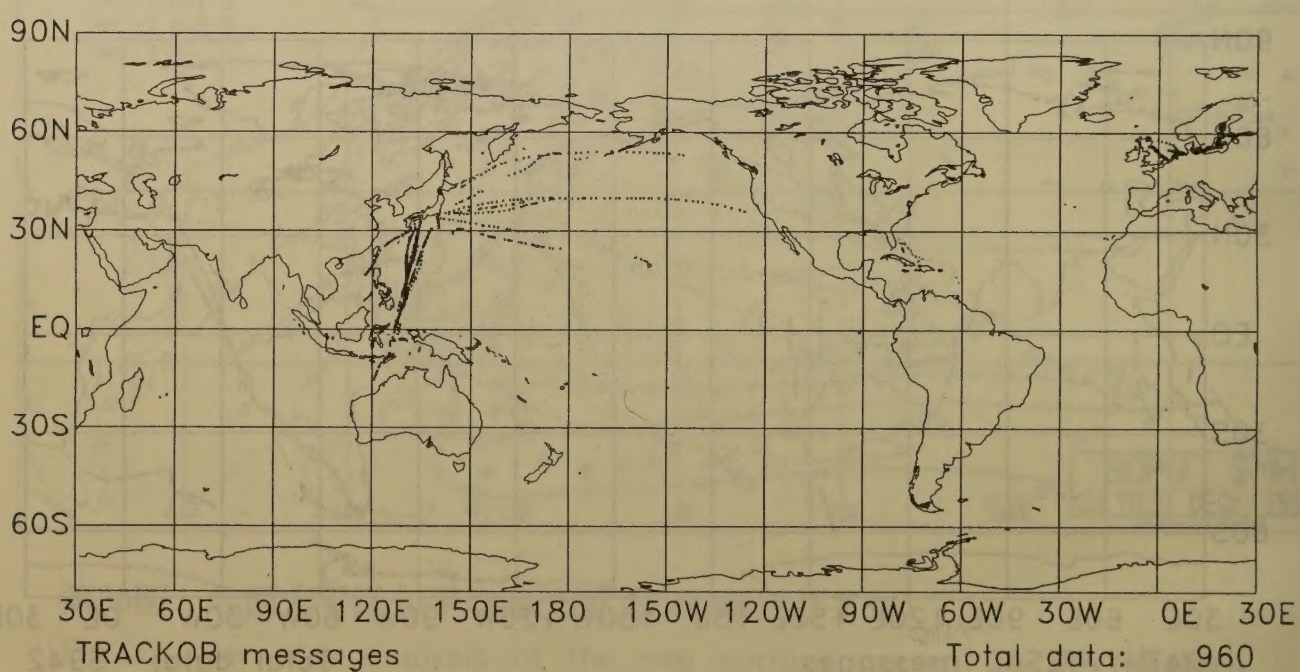




第21-1図　測点分布図(1993年12月)

Fig.21-1　Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for DEC 1993.





第21-2図　測点分布図(1993年12月)

Fig.21−2 Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for DEC 1993.

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